



DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

December 7, 2007

REPLY TO
ATTENTION OF

Inland Environment Team
Planning and Environmental Division

Ms. Gail Carmody
Field Supervisor
U.S. Fish and Wildlife Service
1601 Balboa Avenue
Panama City, Florida 32405-3721

Dear Ms. Carmody:

This letter provides supplemental information to our previous letter dated November 21, 2007, and an updated trigger to be used to determine when an additional reduction in flows from Jim Woodruff Dam would be prudent in order to manage remaining storage in the Apalachicola, Chattahoochee, Flint Rivers (ACF) basin under the Exceptional Drought Operations (EDO), which were initiated on November 16, 2007. At that time, an initial reduction in flow from 5,000 cubic feet per second (cfs) to 4,750 cfs was initiated subject to meeting the EDO initial trigger. The Amended Biological Opinion (BO) and Conference Report issued by the Service on November 15, 2007 included a reasonable and prudent measure (RPM) that specifies an additional trigger would be developed before implementing the next incremental reduction in flow to 4,500 cfs. Specifically, "RPM6. Minimum Flow Criteria and Triggers," states:

"By December 7, 2007, the Corps shall, in cooperation with the Service, determine appropriate criteria for initiating a reduction from 4,750 cfs to 4,500 cfs in the EDO minimum releases from Woodruff Dam. The criteria shall consider all appropriate monitoring data and models (e.g., survey of mussels mortality under condition 7.4.5.e, composite reservoir storage, climatic and hydrological conditions experienced, hydrological models, meteorological forecasts) to specify when a reduction is needed and the probable impacts to project purposes or other resources avoided by a reduction at that time, including impacts to listed species that would likely occur without the reduction."

Our previous letter proposed a trigger for the incremental reduction to 4,500 cfs that included two components based on a measure of the cumulative basin inflow above Walter F. George Dam (a measure of basin inflow on the Chattahoochee arm that is capable of being stored in the upstream federal storage reservoirs) and the cumulative basin inflow on the Flint River (a measure of basin inflow contributing to meeting the minimum flows below Jim Woodruff Dam, which provides some relief from the demands on storage in the upstream federal storage

reservoirs). As a result of continuing consultation discussions with the Service, we now add a third component that reflects the status of Composite Storage within the basin. The proposed trigger for a reduction to 4,500 cfs is revised to reflect three components, as shown below, all of which would need to be met in order to exercise the trigger:

- a. Cumulative Annual Basin Inflow above Walter F. George Dam < 5th Percentile Historic Flows: This trigger represents a measure of the amount of inflow received in the three storage reservoirs in the basin, Lake Lanier, West Point Lake and Walter F. George Lake. The trigger is a cumulative annual value designed to capture the importance of sustained low flows on reservoir storage and recovery. Coupled with the Composite Storage Trigger described in paragraph c. below, this trigger indicates a prolonged and sustained reduction in inflows to the storage reservoirs meriting further outflow reductions.
- b. Monthly Basin Inflow above the Newton Gage on the Flint River < 5th Percentile Historic Flows: This trigger represents the flow contribution of the uncontrolled Flint River. When combined with the Composite Storage Trigger described in paragraph c. below, and cumulative annual basin inflows on the Chattahoochee River less than the 5th percentile of historic flows described in paragraph a. above, flows less than the 5th percentile on the Flint River represent a continuation of critically low inflows and result in further rapid depletion of the remaining basin storage to meet the downstream flow requirements below Jim Woodruff Dam.
- c. Composite Storage Trigger Zone for 4,500 cfs Incremental Reduction in Flow: In addition to the above two components, a third component to the trigger has been identified to reflect that the resulting impact on Composite Storage has reached critical levels, meriting the next incremental reduction in releases. As shown on the enclosed figures, the Composite Storage Trigger Zone is the combined Composite Storage volumes resulting from Lake Lanier/Buford Dam being at the top of Zone 4, and both the West Point and Walter F. George projects being at the bottom of Zone 4/top of inactive storage. This represents a storage condition equivalent to all three reservoirs being within drought management conditions (Zone 4), and all flows in support of meeting the downstream minimum releases being drawn from Lake Lanier.

As noted in the EDO, an evaluation of the status of basin conditions will be conducted at the first of each month to determine whether the trigger components have been met. Once the above three components are all met, then a determination would be made on whether and when the trigger for an incremental reduction to 4,500 cfs release would be exercised. This determination may consider other relevant information, including recent climatic and hydrologic trends and forecasts of climatic and hydrological conditions, or other critical basin needs or anticipated impacts. Once the determination is made to exercise the trigger, releases from Jim Woodruff Dam would be made to meet the 4,500 cfs minimum flow, and storage of inflows above the 4,500 cfs would occur. Additional releases would be made as necessary to maintain head limits or due to other operational constraints, as has occurred during recent rainfall events when the releases resulted in flows over 5,000 cfs. Under the EDO, we would maintain the

4,500 cfs minimum flow once triggered until Composite Storage is restored from Zone 4 into Zone 3, at which time the EDO would return to maintaining the 5,000 cfs minimum flow. Discontinuation of the EDO would occur once Composite Storage is restored from Zone 3 into Zone 2, at which time the operations would return to those specified under the interim operation plan.

Enclosed is an assessment of the current status of each of the three components for a 4,500 cfs flow reduction trigger, effective December 1, 2007. This assessment demonstrates that all three components of the 4,500 cfs flow reduction trigger have been met. This also serves as the monthly update of the status of the hydrology of the system, including composite system storage, as required by RPM1 of the Amended BO.

In further support toward implementation of the next incremental reduction in releases, we offer the following additional information regarding hydrological and climatic trends and forecasts. Enclosed is a summary of hydrological data and modeling information considered in determining the hydrological status for the basin and forecasts relating to impacts on composite storage and the ability to sustain minimum flows, (this information was also used to assist in identifying possible triggers for a reduction in flow support).

- Hydrological Trends. As previously noted, our modeling assessments included in the U.S. Army Corps of Engineer (Corps') Biological Assessment dated November 1, 2007, and in the Service's Amended BO dated November 15, 2007, assumed that the 10th percentile flows would represent the worse case scenario. We determined in forecasts using the 10th percentile flows that maintaining a 4,750 cfs minimum release would not exhaust composite storage for the approximately 2-year period modeled. However, we have since then experienced inflows into the basin during the past several months that are below the 2nd percentile of historic flows. Monthly basin inflows above Walter F. George have been below the 2nd percentile historic flows since August 2007. The accumulated basin inflow above Walter F. George has been below the 2nd percentile of historic flow since late September 2007.

- Multi-year Drought Concerns and Forecast Storage Impacts. If these extreme hydrological conditions were to continue, our modeling results indicate that maintaining the 4,750 cfs minimum release would in fact exhaust composite storage in the basin by the fall of 2008. Although there is a great deal of uncertainty in attempting to project long-term forecasts, our modeling forecasts show that by October 2008 significant shortages in providing the minimum flows on the Apalachicola River would also occur (as measured at the Chattahoochee, Florida gage) once composite storage is exhausted. Exercising the trigger to reduce flows to the 4,500 cfs increment now could defer or avoid the need to exercise the next incremental reduction to 4,150 cfs, as well as minimize the risk of depleting all conservation storage. The enclosed modeling shows that attempts to store more water now would place the ACF storage reservoir in a better

position next spring to support a multiple year drought scenario. In the spring of 2007, the Lake Lanier elevation was as high as 1,067.8 feet, but has continued a significant decline since then to a new record low elevation of 1,051.7 feet. The Lake Lanier elevation is expected to continue to decline through the rest of the year. If Lake Lanier begins the spring of 2008 at an elevation near or below 1,050 feet, then the ability to continue to maintain augmentation releases at Jim Woodruff Dam could be significantly at risk if conservation storage becomes depleted.

- Benefits to Project Storage and Purposes. Enclosed is a summary of the project storage benefits accrued since implementation of the EDO on November 16, 2007. Storage benefits include savings of approximately 6,745 acre-feet of composite storage within the basin (which represents approximately 340 day-second-feet or 675 acre-feet per day), and a net increase in storage of approximately 22, 134 acre-feet through December 2, 2007, due to the Thanksgiving week rainfall events. Most of this rainfall was stored in Walter F. George Lake, with lake levels increasing approximately 1.5 feet, but still remaining 1.5 feet below winter pool. West Point Lake levels remain fairly steady and Lake Lanier levels continue to decline. The project storage benefits from storage of increased basin inflows only occur if it rains within the basin and above the storage projects. Unless the increases in basin inflows are significant and sustained, they will provide only short-term limited storage benefits. Lacking rainfall in the basin, additional storage benefits can only be obtained by an additional incremental reduction in releases from the storage reservoirs. The benefits to be gained by an additional 250 cfs reduction of flow (incremental reduction from 4750 cfs to 4500 cfs) is an estimated savings of 250 cfs per day in storage. Saving this storage now prolongs the amount of time releases can be made later, including releases for critical needs such as hydropower, water supply and water quality. At current conditions in Lake Lanier, a savings of 250 cfs is equivalent to approximately 55 megawatts per day in hydropower generation; or to approximately one-third of the daily municipal water supply needs on the Chattahoochee River at Atlanta (estimated daily demand of 750 cfs); or one-third of the daily minimum flow requirement for water quality on the Chattahoochee River at Peachtree Creek (750 cfs). A savings of 250 cfs per day for 90 days (until approximately March 1) would be equivalent to approximately 22,500 day-second-feet, or 44,700 acre-feet. That would equate to a difference in elevation at Lake Lanier of approximately 1.5 feet. Extending this savings in storage for an additional 90 days, until June 1, would provide for a total savings of approximately 45,000 day-second-feet, or 89,400 acre-feet in storage at Lake Lanier.

- Climatic and Hydrological Forecasts. Forecasts provided by the National Weather Service continue to predict that strong LaNiña conditions in the Pacific Ocean will persist and are anticipated to result in increased probabilities of a very warm and dry winter in the ACF basin and continue into the spring months. Our staff meteorologist indicates that this December could be the driest ever recorded. A drought during the winter in the Southeast is extremely rare. The current drought has extended into winter and is forecast to severely impact conditions this spring. The Corps reservoirs are dependent on winter

and spring rains to refill to summer levels and provide necessary storage to augment low flows during a dry summer and fall. Without this refill, the Corps ability to augment flows during a dry summer and fall would be significantly jeopardized. Reducing the flow at this time would enable the Corps to maximize the probability that the reservoirs would refill to levels that will allow them to sustain augmentation flows through the current multi-year drought. Under current conditions, Lake Lanier could be five feet lower on June 1, 2008, than predicted in the analysis performed for the Amended BO. This difference represents approximately 150,000 acre-feet less storage, or approximately 14 percent of conservation storage in Lake Lanier. This amount of storage would allow for continued support of the 4,500 cfs flow requirement for an estimated additional 25 days.

- Operations Using Inactive Storage. The current drought has resulted in record use of the total conservation storage from the Federal reservoirs. On November 6, 2007, we reached a new record low in total remaining conservation storage in the ACF Basin. Lake Lanier dropped below the previous record low elevation of 1052.7 feet on November 19, 2007 and continues to fall. It has become increasingly necessary to evaluate the possible consequences of complete use of the system conservation storage, and the need for a possible drought contingency plan for use of inactive storage in the ACF reservoirs. We are in the process of developing such contingency plans at this time, but under such a scenario reservoir operations would necessarily be restricted to meeting the critical needs of the system. Under this contingency scenario, the system needs would be prioritized to meet public health and safety, using the following criteria: maintain structural integrity of the projects; provide water to meet demands of local municipalities; maintain instream water quality; provide sufficient cooling water for the private thermoelectric power plants and support the endangered species in the Apalachicola River. The inactive storage will be subdivided into three action zones, similar to the conservation storage. The action zones would represent triggers to meet highest priority needs. Water managers would restrict releases, based on the above priorities, as storage decreases or falls into lower action zones. For example, if the conservation storage is depleted, some limited support to endangered species and thermoelectric power plants would be provided. As levels within the inactive storage continues to fall below the next lower action zone, then support for these uses would be discontinued and only releases in support of water supply and water quality would continued to be made. As levels continue to drop, only releases for water supply and structural integrity would be made. At some point, only releases for structural integrity would be made. It is clear that once we are restricted to operating in the inactive storage zones of the federal projects that only limited support to endangered or threatened species would be possible, and at some point would be eliminated. We will continue to consult with your agency and others as we continue to develop this contingency plan. For this reason, we are continuing to evaluate necessary actions that would allow some refill of the reservoirs during these exceptional drought conditions and to prevent us from using all conservation storage.

- Monitoring Data on Incidental Take of Mussels Due to 4,750 cfs Incremental Reduction in Flow. Following issuance of the Amended BO by the Service, we initiated the first incremental reduction in flows on November 16, 2007. Prior to the reduction in releases, flows were measured at approximately 5,130 cfs at a stage of 39.15 feet; and were stabilized within the first few hours following the reduction of releases to 4,770 cfs and a gage reading of 38.91 feet as measured at the U.S. Geological Survey (USGS) gage at Chattahoochee, Florida. Stages downstream were measured to be 27.39 feet prior to the reduction in flows, and stable at a reading of 27.29 feet at the Blountstown, Florida gage on November 17, 2007. Prior to reduction in releases, stages were measured at 10.97 feet, with a reading of 10.88 feet at the Wewahitchka, Florida gage once river stages stabilized on November 18, 2007 (All elevations are based on the National Geodetic Vertical Datum of 1929). These gage readings represent a fall in stage of approximately 3 inches in the upper river near Chattahoochee, approximately 1.5 inches near the Blountstown gage, and approximately 1 inch in the middle river near the Wewahitchka gage. Monitoring for incidental take of listed mussels was conducted by the Corps and U.S. Fish and Wildlife Service during November 17-20, 2007 in conformance with the requirements of RPM5.e. in the Amended BO. Sampling was conducted at 44 sites, moving downstream as river flows and stages stabilized. A summary of the monitoring conducted and the computed estimates of incidental take are enclosed.

The Amended BO authorized incidental take for up to 100 purple bankclimber mussels, up to 100 Chipola slabshell mussels, and up to 5,600 fat threeridge mussels for the incremental reduction in flow to 4,750 cfs. Our mussel mortality monitoring found no take of purple bankclimber or Chipola slabshell mussels; but documented an estimated take of 1,469 fat threeridge mussels. This estimate falls well within the estimated take included in the Amended BO. Although additional take of mussels is anticipated to occur with an additional incremental reduction in flow to 4,500 cfs, there is no reason to expect that it would exceed the authorized incidental take included in the Amended BO (i.e., up to a total of 100 individual purple bankclimber mussels, up to a total of 100 individual Chipola slabshell, and up to an additional 15,400 fat threeridge mussels).

We have been discussing with your agency possible revisions to the sampling protocol for estimating the amount of incidental take of mussels for the 4,500 cfs increment, to include the incorporation of additional mussel habitat site information being collected by the Service this week. Some recommended revisions are included in the summary report of incidental take monitoring for the 4,750 cfs incremental reductions in flow. The coordinated revised sampling protocol will be implemented in association with monitoring for incidental take of mussels to be conducted for the 4,500 cfs incremental reduction in flow.

Because of the above factors, we continue to believe that implementation of the second EDO incremental reduction in flows to 4,500 cfs should be implemented.

If you have any questions or require any additional information regarding the enclosed the anticipated exceptional drought impacts, modeling information, or proposed EDO trigger for a reduction to 4,500 cfs, please contact Ms. Joanne Brandt, Senior Environmental Specialist, (251) 690-3260, email: joanne.u.brandt@usace.army.mil; or Mr. Brian Zettle, Biologist, (251) 690-2115, email: brian.a.zettle@usace.army.mil.

Sincerely,

A handwritten signature in black ink, appearing to read 'C. Flakes', with a long horizontal flourish extending to the right.

Curtis M. Flakes
Chief, Planning and Environmental
Division

Enclosures